History of the Waite Arboretum and Waite Herbarium

Jennifer A. Gardner

Waite Agricultural Research Institute, University of Adelaide, Glen Osmond, South Australia, Australia 5064

Abstract

Outlines of the origins and development of the Waite Arboretum and Waite Herbarium are presented. Portraits of past curators and others who have made substantial contributions are accompanied by short biographies. The Waite Arboretum, established in 1928 under the provisions of Peter Waite's bequest to the University of Adelaide, contains about 1,500 trees representing 770 species in 202 genera. Special effort has been made to obtain trees from homoclimes that might do well on the Adelaide Plains under natural rainfall. The Arboretum is an invaluable resource for seed collection, research, and teaching as well as providing a pleasant and informative recreational space. The Waite Herbarium comprised over 52,000 numbered sheets of primarily southern Australian species and weedy and agricultural species when it was transferred to the State Herbarium of South Australia.

On 3 October 1913, Peter Waite (Fig. 2) wrote to Sir Samuel Way, Chancellor of the University of Adelaide, stating his desire to offer as a gift to the University, his 'Urrbrae' estate, a mansion house set in 53 ha of agricultural and grazing land. The eastern half was to be used for the purposes of research and teaching in the fields of agriculture, botany, entomology, horticulture and forestry. The remaining 27 ha were 'to be a public park under the control of the University, but if it be thought advisable . . . 10 or 15 acres [4 or 6 ha], or such area as might be found necessary, should be used as a students' sports ground' (Edgeloe 1984, p. 7). Subject to the life tenancy of Mr Waite and of his wife, the Urrbrae estate was formally transferred to the University by deed of gift executed on 29 January 1914.

Occupation of the Urrbrae estate by the University took place on 3 February 1923, and on 26 March 1923 a committee of 12 members was appointed to make recommendations to the University Council on how best to give effect to the objectives of the bequest. The Committee's report, dated 19 May 1923, recommended unanimously that the public park take the form of an arboretum, to be designed and planted over a dozen years, and T. G. B. Osborn, Professor of Botany, offered to assist by finding seeds of rare or interesting trees (Urrbrae Committee 1923).

Planning and establishment of the Arboretum

The Arboretum location is 34°58′S, 138°38′E at an altitude 100–110 m. It is virtually frost free with a winter rainfall of 625 mm followed by a warm dry summer. Mr H. Hugh Corbin, Lecturer in Forestry, observed that 2,400,000 ha of land in South Australia has a climate like that of Urrbrae from an arboricultural point of view, so that the Arboretum would offer an exceptionally good opportunity for testing the adaptability of different species to local soil and climate, and thus its experimental value would be great (Corbin 1923). He prepared a tentative list of 56 trees to plant which included willows, elms, conifers, palms and figs. The Australian trees he suggested were silky oak (*Grevillea robusta* A. Cunn.), two species of native pine (*Callitris* Vent. spp.), four species of sheoak (*Casuarina* Adans. and *Allocasuarina* L. Johnson spp.), *Agathis* Salisb. and *Araucaria* Juss. species. Corbin recommended that the trees be spaced in such a way as to give ample room to show the natural growth habit of each species, and suggested a distance of 20 m between specimens.

Dr Arnold E. V. Richardson (Fig. 3), foundation Director of the Waite Institute (1924 to 1938), planned and established the Waite Arboretum with great energy and enthusiasm. In devising the layout and selecting the trees, Dr Richardson consulted with many authorities. In his report to the University Council (Richardson 1928b) he acknowledged the assistance and advice of the following specialists: Mr J. F. Bailey, Director of the Adelaide Botanic Gardens; Mr. F. J. Rae, Director of the Melbourne Botanic Gardens; Mr E. Julius, Conservator of Forests; Mr S. Griffiths, Government Town Planner; Mr G. Melville, Forest Department of South Australia; Mr G. Quinn, Chief Instructor of Horticulture; and Mr A. W. Pelzer, City Gardener. The original layout (Fig. 1) was primarily a series of circles and sweeping paths, with a broad stately avenue of English elms (*Ulmus procera* Salisb.) providing a magnificent vista from the centre of the Institute building to the sea.

Initially, two main areas were envisaged, with hardier indigenous trees on the higher areas where the soil is shallow and the subsoil of a gravelly nature, and exotic trees on the lower areas with deeper soil (Richardson 1928b). Arrangement of the trees within those two areas was to be on taxonomic grouping. Corbin (1923) considered that 'the scenic effect which may be produced by landscape forestry is not the object which is to be held in view but rather the economic and scientific value of the collection of trees and the data derivable from them'. In contrast, Richardson (1927) stated: 'Though the main aim of the Arboretum will be educational it is not desirable to sacrifice the aesthetic aspect of the planting for mere systematic and formal

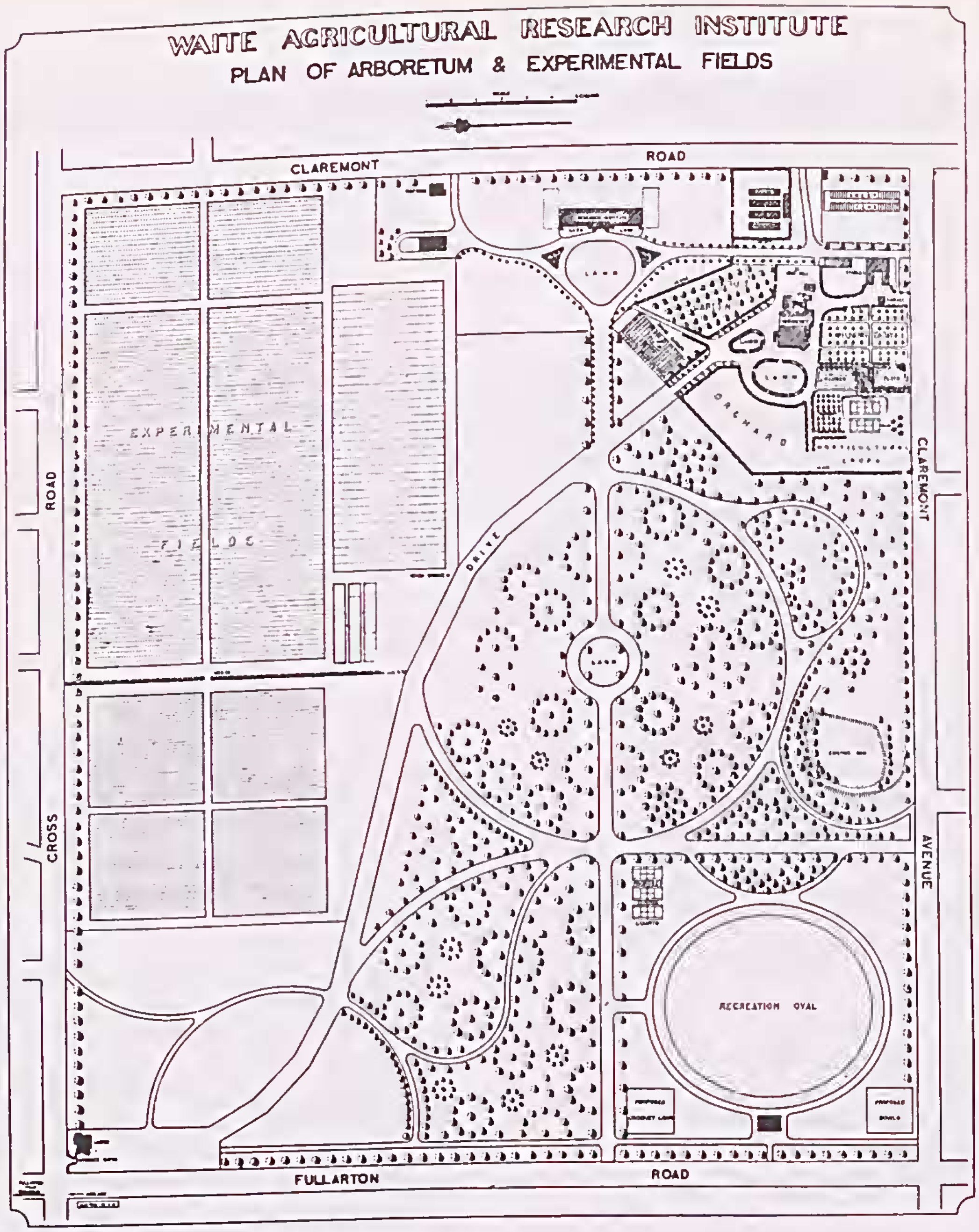

Fig. 1. Plan of Waite Arboretum (about 1931).

arrangement of species', and he envisaged a third area of mixed native and exotic species planted for aesthetic effect. However, this objective was never really achieved and has since lapsed.

Trees were obtained from a number of sources: 200 were donated by the Directors of the Botanic Gardens of Adelaide and Melbourne; the Federal Capital Commission gave 100; the New South Wales Forestry Commission supplied a fine collection of 460 trees and shrubs; and an additional 300 trees and shrubs were obtained from horticultural institutions and various nurseries in N.S.W., Victoria and South Australia (Richardson 1928b,c,d, 1929). In addition, seed came from New Zealand and the Boyce Thompson Arboretum in Arizona, and from Dr Richardson himself, secured on visits to California and Japan (Richardson 1927, 1928c).

Planting began in 1928, just three years after the Institute was established, and by 1930, some 1,020 trees representing 367 species in 180 genera and 67 families had been planted (Waite Institute Report 1925–1932). The expenditure for fencing, tree guards, labour, trees, water cart, and water supply for the first year was projected to be £350 (Richardson 1928b). Each tree was labelled with its botanical name, common name, family, area of occurrence and date of planting.

Frederick A. Couzens, Jnr (Fig. 4) grew up on the Urrbrae estate where his father was head gardener. In 1928, the first Director placed him in charge of the newly established Arboretum, at an annual salary of £203 17s (Richardson 1928a). During the next 40 years of his association, Couzens took particular interest in the eucalypts, and due in large part to him, the Waite Arboretum now has one of the most comprehensive collections of eucalypts anywhere, about 270 species and subspecies.

There are two special areas planted with eucalypts, one of over 70 large species established in 1949 in the northwest corner of the Arboretum, the other an enclosed area adjacent to Urrbrae House where 160 mallees were planted in 1955, small species in triangles, medium size in pairs, and the taller as single specimens.

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Figs 2–5. 2. P. Waite (Photograph: from *Our Pastoral Industry* 1910); 3. A. E. V. Richardson; 4. F. A. Couzens; 5. J. A. Prescott. (Photographs 3–5: Waite Institute, Photographic Section.)

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Figs 6 & 9. **6.** C. M. Eardley; **7.** E. L. Robertson (Photograph: David Robertson); **8.** D. E. Symon (Photograph: *The Advertiser*); **9.** R. D. Pearce. (Photographs 6 and 9: Waite Institute, Photographic Section.)

Couzens (1966) carefully recorded the success or otherwise of these eucalypts in his unpublished manuscript written on his retirement. Some of the larger eucalypts from higher rainfall areas of N.S.W. and Queensland flourished initially, but after more than 30 years, competition for water is high and a number of them have succumbed to summer droughts. However, every effort is being made to continue and enlarge this collection with the aim that ultimately, every eucalypt suitable to the area will be represented.

Emeritus Professor James A. Prescott (Fig. 5), second Director of the Waite Institute (1938 to 1955), was a soil scientist of international repute. Like his predecessor, Dr Richardson, he took a deep interest in the Arboretum and kept a firm hand on plantings. He was particularly keen on oaks, and together with Mr L. Pryor of Canberra, introduced 20 species of evergreen oaks from California. Professor Prescott was also a rose enthusiast, and added another 95 cultivars to Peter Waite's original rose garden.

The establishment of the Waite Herbarium and appointment of a taxonomic botanist

Constance M. Eardley (Fig. 6) was the first taxonomic botanist to join the staff of the Waite Institute. She held a joint appointment to the University of Adelaide Department of Botany and the Waite Institute as Curatrix of Herbaria from 1933 to 1949. The Adelaide Waite Herbarium (ADW) had been started in 1930 by Arthur B. Cashmore, when on a CSIR studentship (Symon 1984). At first the collection grew slowly, however, it increased substantially in the early 1940s with the donation to the Institute of the Albert Morris Herbarium of 8,000 specimens collected in the region of Broken Hill and western New South Wales.

Miss Eardley was a collaborator in the extensive ecological work of R. L. Crocker and N. S. Tiver and co-authored with Crocker a paper on a South Australian sphagnum bog (Crocker & Eardley 1939). Following an expedition to the Simpson Desert in 1939, in which Crocker took part, Miss Eardley published on its phytogeography compared with other sand-ridge deserts of the world (Eardley 1948). She also wrote several papers on weeds, and later was co-author with Veda Cruickshank of the pocket handbook *Wildflowers of the Adelaide Hills* (1972). In addition to the curation of the Herbarium, Miss Eardley was responsible for the management of the Arboretum. She initiated the recording of the height and diameter of certain trees some of which data were published in *Waite Institute Report 1933–1936*.

George H. F. Clarke, Botanist at the Waite Institute from 1936 to 1939, wrote a series of papers on weeds first published in the *Journal of Agriculture of South Australia*, and subsequently reprinted as a booklet (Clarke 1949). He contributed to the Waite Herbarium specimens of weeds associated with his research.

Nancy T. Burbidge was appointed Assistant Agronomist at the Waite Institute in 1943, mainly to undertake studies on germination and establishment of Australian Chenopodiaceae in the arid and semi-arid regions of South Australia. During this period she published work already completed in Western Australia on the morphology, and anatomy of *Triodia* R. Br., and devised a key to the South Australian species of *Eucalyptus* L. Hér. In 1946 she was appointed Systematic Botanist in CSIRO Division of Plant Industry in Canberra where she developed the then embryonic herbarium into a major centre for taxonomic research. Her position was subsequently transformed into that of Curator, Herbarium Australiense. Dr Burbidge's chief taxonomic studies were of *Enneapogon* Desv. ex P. Beauv. and *Triodia* (Poaceae), *Nicotiana* L. (Solanaceae) and *Helichrysum* Miller subg. *Ozothamus* (R. Br.) N. Burb., *Ixodia* R. Br. and *Vittadinia* A. Rich. (Asteraceae) (Hartley 1977). Her contribution to the Waite Herbarium was small and consisted mainly of eucalypts and native grasses (Robertson 1986b).

Enid L. Robertson (Fig. 7) was appointed to the staff of the Waite Institute in 1947 as Systematic Botanist and was responsible for the taxonomic background to the paper by Dr K. Abele on the cytology of *Danthonia* Lam. & DC. (Poaceae). Mrs Robertson succeeded Miss Eardley in the curatorship of the Waite Herbarium and Waite Arboretum, and added to the herbarium many plants collected by her family when establishing their garden of Australian native plants at Wittunga in Blackwood (now part of the Botanic Gardens of Adelaide). Later, between 1953 and 1955, as a Senior Research Fellow in the University of Adelaide Botany Department, she undertook a revision of part four of J. M. Black's *Flora of South Australia* (Robertson 1965), and taxonomic research on Asteraceae. She has recently published on the seagrasses of southern Australia (Robertson 1984, 1986a).

Frank M. Hilton was Systematic Botanist at the Waite Institute from 1953 to 1955. During this time he commenced studies on the genus *Stipa* L. (Poaceae), and enriched the Herbarium with substantial collections of *Stipa* and other grasses. He collected particularly in the Upper Murray District (Renmark, Berri and Glossop), on Eyre Peninsula towards the Nullarbor Plain, and in the far north of South Australia near Mt Lyndhurst.

David E. Symon (Fig. 8) joined the staff of the Waite Institute in 1950, and was appointed Systematic Botanist in 1956 and Senior Lecturer in Botany in 1962. He has had a much greater influence on the Waite Arboretum than any of the previous botanists. In 1965, he instituted the policy of not watering trees after their establishment, and he made a special effort to obtain trees from areas with a climate comparable to that of South Australia such as South Africa, California, Chile and the Mediterranean region. He extended the collections of *Eucalyptus*, *Melaleuca* L. and *Casuarina* and established a number of arborescent monocotyledons and succulents.

Under Mr Symon's curatorship, the Waite Herbarium quadrupled in size. He contributed about 11,500 specimens with the accent being on accession of southern Australia species, and on weedy and agricultural plants. Mr Symon's taxonomic research included major revisions of *Cassia* L. (Fabaceae) and genera of the Solanaceae. His numerous publications include papers on *Oxalis* L. (Oxalidaceae), plants of the Simpson Desert, a bibliography of subterranean clover *Trifolium subterraneum* L., and many floristic lists for surveys done by the Nature Conservation Society of South Australia. A list of his publications and others from the taxonomic botany unit at the Waite Institute are given in Symon (1984). When he retired as Reader in Agronomy in 1985, the position of Systematic Botanist was discontinued.

Laurie A. R. Haegi was on the staff of the Waite Herbarium as Professional Assistant from 1974 to 1977 working under a grant from Australian Biological Resources Survey. During that time he undertook taxonomic studies on *Datura* L. and *Lycium* L. (Solanaceae). His work on the Solanaceae culminated, in 1982, with the first taxonomic volume of the new *Flora of Australia* (volume 29), co-authored with David Symon and Rosemary Purdie. He is currently Horticultural Botanist at the Botanic Gardens of Adelaide, where his research interests focus on the genus *Hakea* Schrader (Proteaceae), Asteraceae, Solanaceae, and the systematics of cultivated plants. Dr Haegi was succeeded by Philippa Horton until the expiration of the grant at the end of 1979. During this period Dr Horton completed revisions of the genera *Nicandra* Adans. and *Nicotiana* L. in Australia.

Roy D. Pearce (Fig. 9) joined the Waite Institute in 1953 and in 1974 was appointed as Technical Assistant in the Herbarium. His duties included the fortnightly recording of flowering and fruiting data in the Arboretum, a practice initiated by Mr Symon. Mr Pearce performed this task diligently over the next 12 years, accumulating an extensive and valuable body of information, some of which was published in Boomsma (1981). Early in 1986, just before his retirement, Mr Pearce supervised the transfer, to the State Herbarium of South Australia (AD), of the very valuable Waite Herbarium, comprising over 52,000 numbered sheets plus numerous miscellaneous collections, reprints, seed collections and illustrations.

In May 1986, a new half-time position was created for a Botanist to manage and develop the Waite Arboretum and provide a taxonomic botany advisory service to the staff and students of the Waite Institute. Dr Jennifer Gardner was appointed.

The Waite Arboretum today

At present, the Arboretum contains about 1,500 trees representing 770 species in 202 genera. In addition to the extensive collection of *Eucalyptus*, and the very fine collection of evergreen Californian oaks, other special collections include *Pyrus* L., *Pistacia* L., *Juniperus* L. and *Melaleuca* L.

There is an index card for each specimen which, in addition to the information stated on each label, records the origin of the seed or seedling, growth measurements and flowering and fruiting data. When a tree dies or is removed, the card is transferred to a morgue file so that no data are lost. Scientific research presently being undertaken in the Arboretum by Dr Margaret Sedgley and her colleagues concerns the reproductive biology and hybridization of eucalypts.

Current plantings are limited primarily to replacement sites created by the death of trees or by the removal of some over-represented species. Rather rigid initial adherence to the circular patterns, together with a lack of appreciation of the eventual size of some species, had led to the crowding of some specimens so that their natural form is not so readily seen, and a number of sites have had to be abandoned. Wherever possible, new plantings conform to existing generic and family groupings.

International recognition

In October 1986, the International Dendrology Society (I.D.S.) awarded to the Waite Arboretum the Society's bronze plaque as an acknowledgement of the value of the Arboretum as an outstanding collection. The I.D.S. has over 1,000 members in 50 countries, and there has been only one other such award by the Society in Australia.

The Arboretum is open to the public, without charge, every day of the year during daylight hours. There is a steady trickle of local people as well as visitors from interstate and overseas. To foster an awareness of, respect for, and understanding of trees as part of the natural environment, school children and tertiary students are encouraged to visit the Arboretum and undertake assignments and projects. Horticultural students do practical exercises in tree maintenance and a number of University Departments (e.g. Botany, Entomology, Plant Physiology, Plant Pathology, Biochemistry and Agronomy) use the Arboretum as a resource for teaching or for experimental work. Many naturalist clubs and societies have excursions to the Arboretum, and photographs of trees in the Arboretum have been used to illustrate field guides and other books on trees. A marked trail is in place with an explanatory pamphlet available, and guided tours are conducted. The Arboretum is also promoted and widely publicised through the Waite Institute Open Days and at Garden Festivals and other public displays. There is no seed index, but seed is supplied on request, and a list is available of all species represented in the Arboretum.

The Waite Arboretum will continue to play an important role in the horticultural assessment of under-utilised or little known species, and efforts will be made to promote those trees which show potential for amenity and horticultural use. It is not only an invaluable resource for seed collection, teaching and research, it also provides a quiet, pleasant, informative recreational space and is a wonderful asset for all the people of Adelaide.

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